WGA WREZ Project

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Goal of the WREZ

- The goal of the Western Renewable Energy Zone (WREZ) initiative is to develop a *consensus* proposal among the 11 major states, the area of Mexico, and the two Canadian provinces in the Western Interconnection on how best to develop and deliver energy from renewable resource areas throughout the region (including Canada and Mexico) to load centers.
- Partnership with DOE

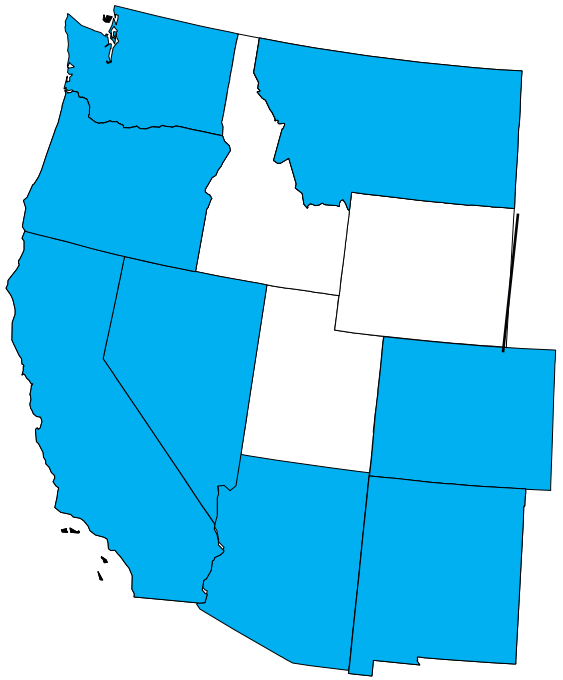
Transmission an Obstacle

- The biggest obstacle to installing large amounts of new renewable energy generation is building new transmission lines.
- The best renewable energy resources in the West are not near existing transmission lines built to carry electricity from fossil fuel burning power plants.
- Western Governors and the Department of Energy began the Western Renewable Energy Zones project in May of 2008 to help overcome the transmission obstacle

Utilities Must Install More Renewable Energy Generation

Western states have adopted mandated targets for the percent of all electricity generation that comes from renewable energy

1.	Arizona	15% by 2025
2.	California	20% by 2010
3.	Colorado	20% by 2020
4.	Montana	15% by 2015
5.	Nevada	20% by 2015
6.	New Mexico	20% by 2020
7.	Oregon	25% by 2025
8.	Washington	15% by 2020

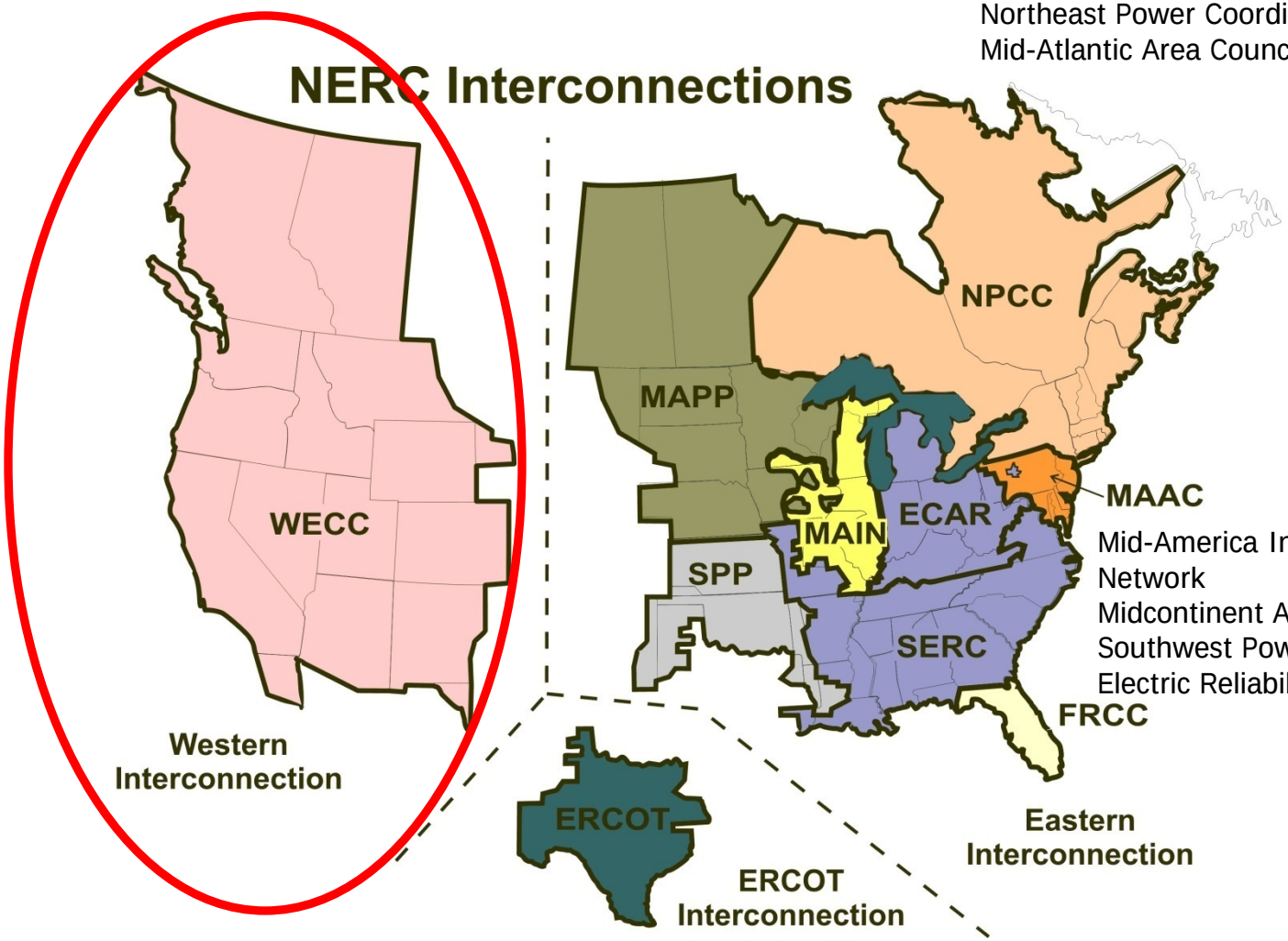


Value Added By Project

LSEs, transmission providers, generation developers, state regulators can make more informed decisions about:

- Costs of renewable power;
- Optimum transmission needed to move renewable power to consumers;
- Potential partners in developing transmission to access renewable areas; and
- Where renewable energy developers can site their facilities to ensure access to the transmission system and minimize environmental impacts.

Context – Western Interconnection



Northeast Power Coordinating Council
Mid-Atlantic Area Council

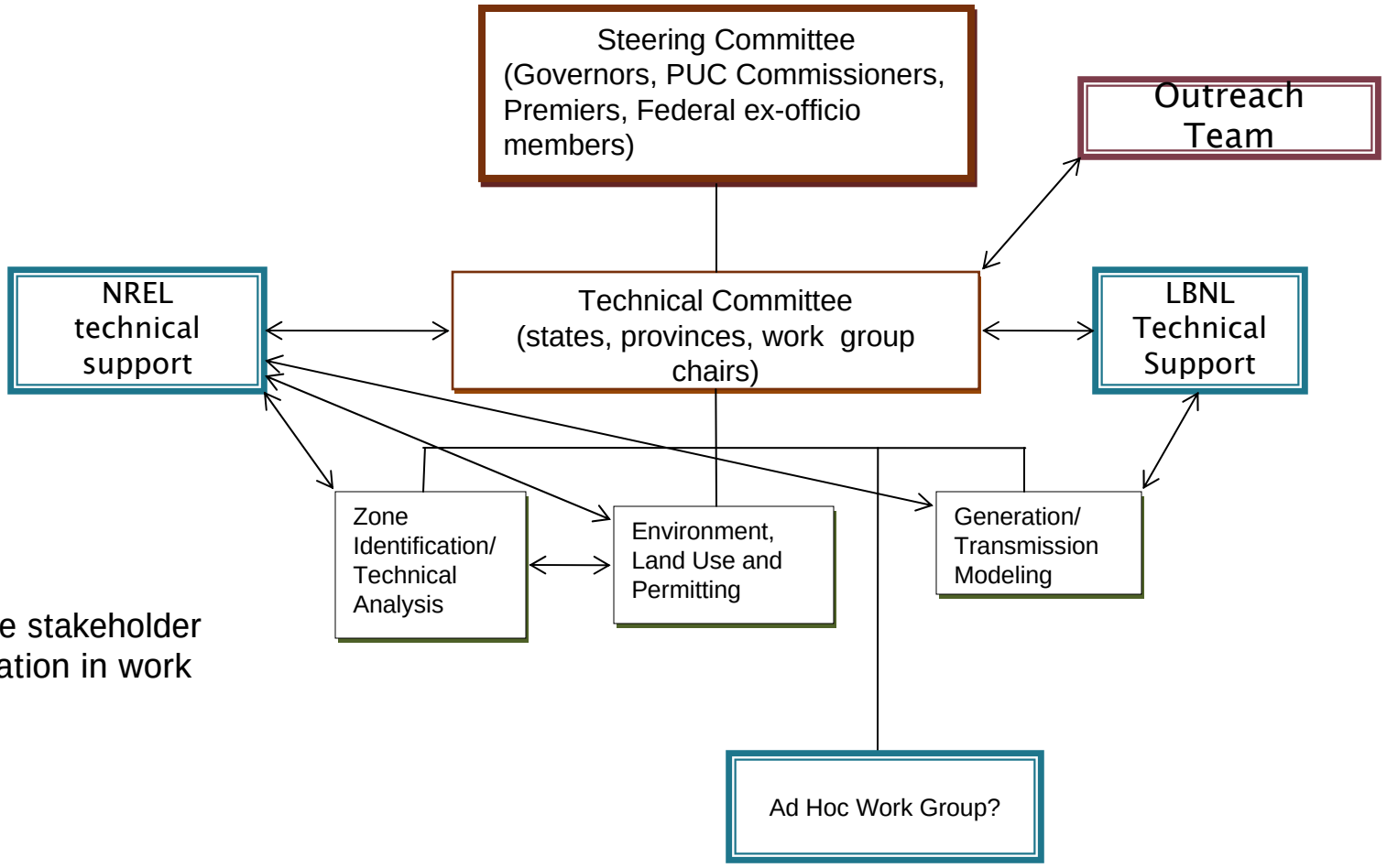
Mid-America Interconnected Network
Midcontinent Area Power Pool
Southwest Power Pool
Electric Reliability Council of TX

Southeastern Electric Reliability Council
Florida Reliability Coordinating Council
Electricity Cooperative Agreement for Reliability

Overview of WREZ Phases

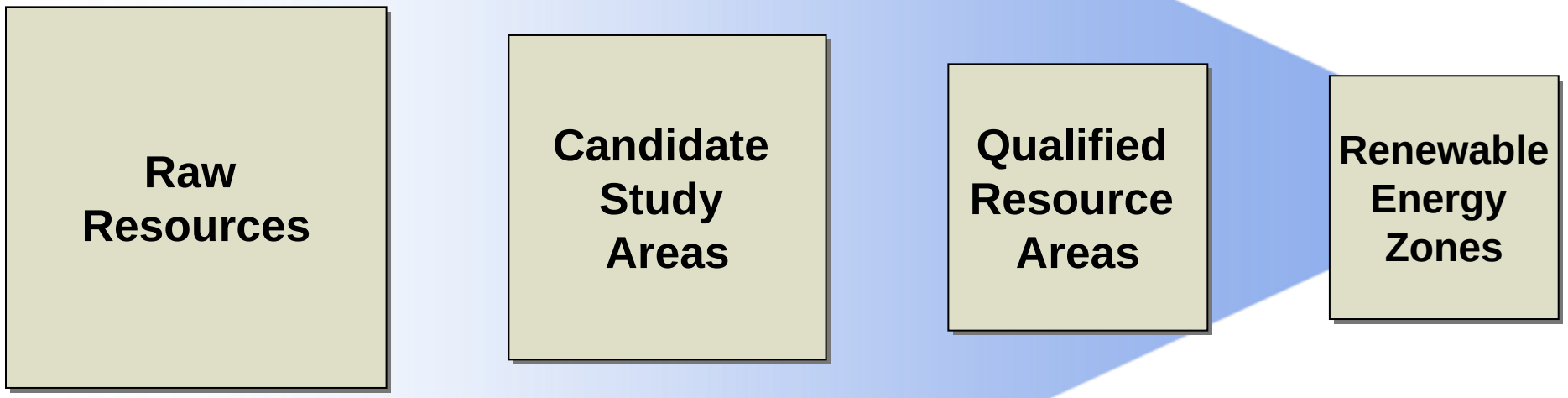
1. Identification of WREZs (Phase 1)
2. Conceptual transmission from WREZs (Phase 2)
3. Coordinated procurement for renewables (beyond current budget period) (Phase 3)
4. Institutional options to facilitate interstate transmission for renewables (beyond current budget period) (Phase 4)

Organization of REZ Project



Inclusive stakeholder participation in work groups

Overview of WREZ "Selection Process"



Definitions

CSA – Reduction of raw resource areas to include areas meeting minimum criteria for resource quality

QRA – Refinement of CSA to account for initial exclusion areas and selection of best resource areas

REZ – Evaluation of QRA after application of all exclusion criteria

CSAs Transformed into QRAs in 5 Major Steps

1. Develop exclusions
2. Apply exclusions
3. Generate a grid
4. Identify QRAs
5. Quantify other resources
    - Biomass, small hydro, undiscovered geothermal and EGS, other resources

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Qualified Resource Area (QRA)
Renewable Energy
Resource Summary

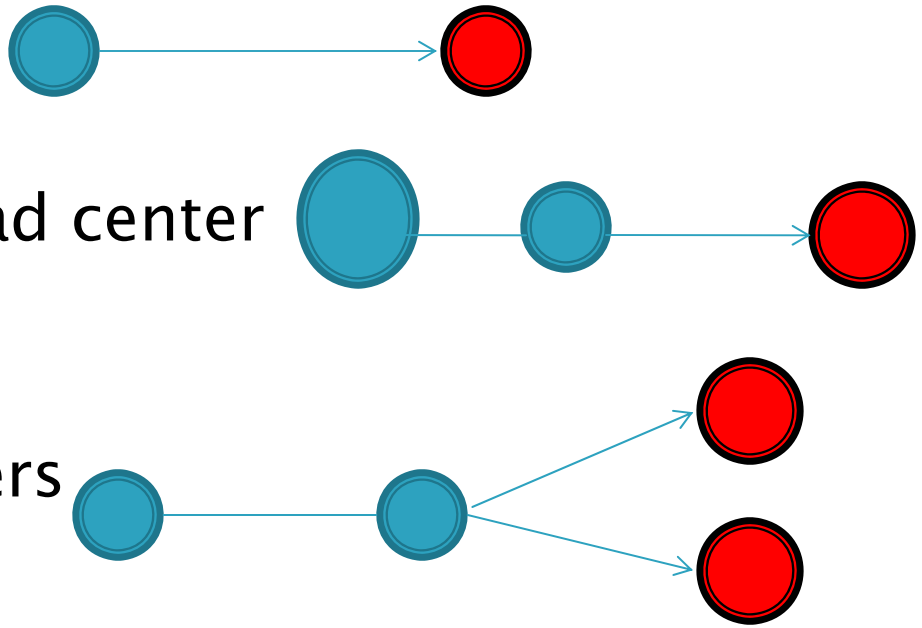
QRA state/ prov	QRA Name	Solar thermal MW by DNI level (kWh/sqmtr/day)[a]						Wind MW by wind power class[a]				Geothermal MW		Hydro MW[d]	Total MW
		6.5 - 6.75	6.75 - 7.0	7.0 - 7.25	7.25 - 7.5	7.5 +	SOLAR TOTAL	3	4	5 +	WIND TOTAL	Discovered	Undiscovered[b,o]		
AZ	AZ_NE	[e]	[e]	[e]	412	0	412	3,316	140	59	3,516	0	[e]	0	3,928
AZ	AZ_NW	[e]	[e]	[e]	2,791	701	3,492	30	3	1	34	0	[e]	0	3,526
AZ	AZ_SO	[e]	[e]	[e]	7,029	0	7,029	4	2	0	5	0	[e]	0	7,034
AZ	AZ_WE	[e]	[e]	[e]	8,900	2,276	11,176	4	0	0	4	0	[e]	0	11,181
AZ Total		[e]	[e]	[e]	19,132	2,977	22,109	3,354	145	61	3,560	0	1,043	0	25,669
BJ	BJ_NO	[e]	[e]	2,874	923	11	3,808	[e]	592	688	1,280	0	[e]	0	5,088
BJ	BJ_SO	[e]	[e]	415	496	51	963	[e]	463	475	938	0	[e]	0	1,900
BJ Total		[e]	[e]	3,289	1,419	62	4,770	[e]	1,054	1,163	2,218	0	[e]	0	6,988
CA	CA_CT	[e]	[e]	558	1,040	998	2,597	1,097	205	42	1,345	0	[e]	0	3,941
CA	CA_EA	[e]	[e]	1,031	1,796	73	2,900	218	21	5	244	0	[e]	0	3,143
CA	CA_NE	[e]	[e]	1,458	3,208	651	5,316	697	80	4	781	0	[e]	0	6,098
CA	CA_SO	[e]	[e]	3,219	436	41	3,696	480	140	131	752	1,434	[e]	0	5,882
CA	CA_WE	[e]	[e]	548	1,606	1,466	3,620	1,460	901	1,045	3,406	0	[e]	1	7,028
CA Total		[e]	[e]	6,815	8,087	3,228	18,129	3,952	1,347	1,228	6,527	1,434	11,340	1	26,092
CO	CO_EA	[e]	[e]	0	0	0	0	[e]	2,470	0	2,470	0	[e]	0	2,470
CO	CO_NE	[e]	[e]	0	0	0	0	[e]	4,067	203	4,270	0	[e]	0	4,270
CO	CO_SE	[e]	[e]	0	0	0	0	[e]	8,884	34	8,918	0	[e]	0	8,918
CO	CO_SO	[e]	[e]	2,463	174	0	2,636	[e]	125	114	239	0	[e]	0	2,875
CO Total		[e]	[e]	2,463	174	0	2,636	[e]	15,545	352	15,897	0	1,105	0	18,533
ID	ID_EA	[e]	[e]	[e]	[e]	[e]	[e]	1,784	219	97	2,100	310	[e]	4	2,414
ID	ID_SW	[e]	[e]	[e]	[e]	[e]	[e]	3,904	236	46	4,185	230	[e]	270	4,685
ID Total		[e]	[e]	[e]	[e]	[e]	[e]	5,688	455	143	6,285	540	1,872	274	7,098
MT	MT_CT	[e]	[e]	[e]	[e]	[e]	[e]	[e]	[e]	2,391	2,391	0	[e]	0	2,391
MT	MT_NE	[e]	[e]	[e]	[e]	[e]	[e]	[e]	[e]	2,037	2,037	0	[e]	3	2,040
MT	MT_NW	[e]	[e]	[e]	[e]	[e]	[e]	[e]	[e]	6,007	6,007	0	[e]	17	6,023
MT Total		[e]	[e]	[e]	[e]	[e]	[e]	[e]	[e]	10,434	10,434	0	771	20	10,454

Minimum and maximum QRA size criteria used to identify QRAs

- Minimum QRA size
  - Solar thermal, wind and large hydro (Canada only): 1500 MW
  - Discovered, conventional geothermal: 500 MW
- Maximum QRA size
  - A collector system cost of $10/MWh
  - ~ Less than 100 miles from collector point

WREZ in a Nutshell

- Proposed renewable energy zones – not too many, not too few
- Transmission modeling to calculate delivered cost
  - REZ to load center
  - Multiple REZs to load center
  - Multiple REZs to multiple load centers



Some Key Characteristics

- Zones have to be “developable”
- Implementation is up to private developers and LSEs
- Proposed projects don’t drive definition of areas
- Complements state REZ efforts
  - Will show resources with value at both regional and local levels

Remaining data needs

Decision on the treatment of military lands and airspace as exclusion areas

Most current E&L exclude and avoid areas (we are still receiving and processing these data)

Canadian environmental exclusion areas
Canadian small hydropower projects

Additional Resources to Be Quantified in QRAs

- Incremental hydropower in the US
- Solid biomass resources
- Undiscovered, conventional geothermal
- Enhanced Geothermal Systems potential
- Non-REZ resources will also be quantified, but not part of QRA’s

WREZ Website – www.westgov.org click on WREZ Project

Organization

Steering Committee
About
Members

Technical Committee
About
Members

Work Groups
* Zone Identification and Technology Analysis
* Environment and Lands
* Generation and Transmission Modeling

Key Documents

Charter
Workplan
Project Assumptions
Operating Groundrules
Phase 1 Roadmap
Organizational Chart

Western Renewable Energy Zones

About the WREZ

The Western Governors' Association and U.S. Department of Energy launched the Western Renewable Energy Zones Project in May 2008. Utilizing those areas in the West with vast renewable resources to expedite the development and delivery of clean and renewable energy is the central goal of the WREZ project. Participating in the project are 11 states, two Canadian provinces, and areas in Mexico that are part of the Western Interconnection.

The WREZ project will generate:

- reliable information for use by decision-makers that supports the cost-effective and environmentally sensitive development of renewable energy in specified zones, and
- conceptual transmission plans for delivering that energy to load centers within the Western Interconnection. A number of factors will be considered, including the potential for development, timeframes, common transmission needs and costs. The project also will evaluate all feasible renewable resource technologies that are likely to contribute to the realization of the goal in WGA's policy resolution that calls for the development of 30,000 megawatts of clean and diversified energy by 2015.

Guiding this initiative is the WREZ Steering Committee, comprising governors, public utility commissioners and premiers. Officials from the Departments of Energy, Interior and Agriculture, as well as the Federal Energy Regulatory Commission, will participate as ex officio members.

Schedule and Milestones

- Jan 23 Steering Committee webcast (1-3 MST)
- Jan 31 WECC study request
- Feb 2-Mar 2 Public Comment period
  - QRA maps
  - Resource criteria
  - Transmission model assumptions
  - Exclusion areas
  - Wildlife categorization criteria
  - Technology assumptions for supply curves
- Feb 2009 Training on use of WREZ model

Schedule and Milestones

- Mar 16 Synthesis of public comments
- April 2 Wildlife categorizations
- April 8 First draft of report
- Week of April 20 Technical Committee meeting and complete Final Draft report
- May 6 Steering Committee meeting
- May 15 Final Report
- June 13 Presentation to Western Governors
- Fall 2009 Completion of Phase 2